



Operational Transport Management Plan - St Catherine's School Waverley 2018 Travel Survey Update



26 Albion Street, Waverley

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1. Introduction

1.1 Background

In order to measure the effectiveness of Operational Transport Management Plan (OTMP) and to have an accurate way of monitoring the condition of consent (A13) stating that no increase in private vehicle trips to the site will be permitted, traffic surveys in the form of automatic tube counts and peak period turning counts at the critical intersections surrounding the site were undertaken in March 2014 by Arup and October 2016, April 2017 and April 2018 by Traffix.

A community consultative committee (CCC) has been established for this project in accordance with the Development Consent. The CCC has reviewed prior drafts of this OTMP and as a result of subsequent discussions between the school and the CCC, it was determined that the 2018 traffic survey should include an additional tube count location on Bronte Road, between Henrietta Street and High Street, to determine the traffic entry of the street network as the intersection of Bronte Road and Leichhardt Street. The survey for 2018 now includes a tube counter on Bronte Road between Henrietta and Prospect Street.

To maintain a consistent approach to the assessment, the same locations have been surveyed for one (1) week during the school term, and also in 2017 one (1) week during the school holidays. The 2017 and 2018 traffic surveys takes into account the existing travel strategies that have been implemented to help identify any reductions in traffic volumes that have already been achieved. Any reduction in private vehicle usage may therefore act as credit for the site, enabling the additional proposed enrolment of students, with no net increase in traffic generation to the site.

2. Travel Mode Surveys

2.1 Introduction

This section is to identify current travel mode patterns for both students and staff at St Catherine's School, Waverley. To enable this questionnaire surveys were distributed to staff and parents of school children between Monday 9th April and Friday 13th April 2018. This information is imperative to identifying the existing travel mode patterns and future impacts of the increase in student population and informing the trip distribution assessment.

2.2 Travel Mode Survey Results

Table 1 provides a comparison between 2014 and 2018 Staff Mode Travel Splits.

Table 1 - 2014, 2017 and 2018 Staff Travel Mode Splits

Year	ARUP 2014	Traffix 2017	Variance	Traffix 2018	Variance
Travel Mode	Percentage	Percentage	Percentage	Percentage	Percentage
Car Driver	71%	70%	-1%	67%	-4%
Car Passenger	3%	3%	0%	3%	0%
Public Transport	19%	16%	-3%	17%	-2%
Walk	5%	9%	4%	8%	3%
Cycle	2%	2%	0%	5%	2%

Source: Arup, 2014 and Traffix Surveys, April 2018

It can be seen from Table 1 that the percentage of respondents driving to the site has decreased this year by 4% (8 staff) from the 2014 baseline levels. The number of respondents cycling or walking to the site has increased by 5% (12 staff), which suggests a proportion of staff which previously drove to the site now walk or cycle. The percentage of staff travelling to/from the site by public transport has decreased by 2% (4 staff) and car passengers remains unchanged in comparison with 2014 baseline levels. Table 2 provides a comparison between 2014 and 2018 Student Mode Travel Splits.

Table 2 - 2014, 2017 and 2018 Student Travel Mode Splits

Year	Arup 2014	Arup 2014	Traffix 2017	Traffix 2017	Traffix 2018	Traffix 2018	Variance	Variance
Travel Mode	AM Peak Period	PM Peak Period	AM Peak Period	PM Peak Period	AM Peak Period	PM Peak Period	AM Peak	PM Peak
Private Vehicle	60%	46%	55%	45%	54%	43%	-6%	-3%
Walk	16%	24%	21%	25%	18%	22%	+2%	-2%
Bus Service Catherine's Bus	4%	7%	7%	7%	8%	9%	+4%	+2%
Public Transport	15%	18%	16%	24%	20%	26%	+5%	+8%
Other	5%	5%	0%	0%	0%	0%	-5%	-5%

Source: Arup, 2014 and Traffix Surveys, April 2018

2.1.1 AM Peak period

It can be seen from Table 2 that the number of students travelling by private vehicle to the site decreased by 6% (61 students) in comparison with 2014 baseline numbers. Furthermore, 54% (551) of students travelled to school by private vehicle during the AM Peak which is 31 students below the maximum number of students permitted to travel to school by private transport in accordance with the Condition of Consent. The number of students travelling to the site by the St Catherine's private bus service increased by 4% (41 students) and the number of students walking to the site increased by 2% (20 students) in comparison with 2014 baseline numbers.

2.1.2 PM Peak Period

It can be seen from Table 2 that the number of students travelling home by private vehicle from the site decreased by 3% (31 students) in comparison with 2014 baseline numbers. The number of students travelling to the site by public transport increased by 8% (82 students). Furthermore, the number of students travelling home from the site by the St Catherine's private bus service increased by 2% (20 students) and the number of students walking home from the site decreased by 2% (20 students) in comparison with 2014 baseline numbers.

It is evident from comparison of the ARUP 2014 and the TRAFFIX 2017 student travel mode splits, shown in **Table 1** and **Table 2**, that there is a reduction in private vehicle usage and subsequently increase in active and public transport. Although the reduction is relatively minor in the order of 5% and 1% in the AM and PM peak period respectively, it is considered a measurable change in the right direction and vindicates the success of the OTMP.

Similarly with the staff travel mode split results, the TRAFFIX 2017 data, indicates a 1% decrease in private driver only car usage and subsequently a 4% increase in walking as the mode of transport to

and from school. Unexpectedly, there is a decrease in public transport usage, dropping 3%, nevertheless this did result in an increased car driver only usage rate, thereby meeting the OTMP objectives of no net increase in private car usage.

2.3 Future Travel Strategies

A number of travel strategies have already been put into place to encourage active travel, reduce the reliance on private vehicle travel for staff and students and to minimise the traffic impacts from activities undertaken within the RPAC. The 2014 ARUP report provided travel mode targets for staff and students to achieve no net increase in private vehicle trips to the school as follows:

Table 3 identifies the student numbers for 2014 to 2030 which will be required to be achieved to ensure no net increase in traffic is met for the student population

Table 3 - Student Population from 2014 to 2030

Year	Total Student Population	Private Vehicle	Students by Bus	Student by Car Pool	Students by Public Transport	Students by Active Travel
2014	970	582	39	48	146	155
2018	1020	582*	92	48	204	94
2020	1,050	582	102	48	214	104
2021	1,065	582	107	48	219	109
2022	1,080	582	112	48	224	114
2023	1,095	582	117	48	229	119
2024	1,110	582	122	48	234	124
2025	1,125	582	127	48	239	129
2026	1,140	582	132	48	244	134
2027	1,155	582	137	48	249	139
2028	1,170	582	142	48	254	144
2029	1,185	582	147	48	259	149
2030	1,200	582	152	48	264	154

*54% of the 2018 student population (1020 students) equates to 551 trips which is below the baseline of private vehicles arriving at the site in 2014.

It can be seen in Table 3 that in 2030 when the school has a capacity of 1,200 students and under the circumstance that all non-private vehicle travel modes are utilised by new students equally – 152

students will be required to travel by Bus, 264 students by public transport and 154 students by active travel.

In addition the student population increase has been divided evenly amongst all other modes of transport between 2019 and 2030. These figures are indicative and expected to be different in reality which has been the case between 2014 and 2018 as demonstrated above.

Table 3 is to be updated each year to reflect the actual travel mode patterns of the student population.

3. Transport Mode Target Setting

3.1 Introduction

To meet the OTMP goals, the following staff travel goals are to be met, these include:

- ➊ 23% of staff to utilise public transport
- ➋ 9% of staff to participate in active travel
- ➌ 5% reduction in private car use by staff

3.2 Staff Travel Targets

The travel mode splits for staff in 2018 and the future targets for staff are provided in Table 3. The targets include a 5% improvement on private vehicle reliance for staff from 2014 survey results.

Table 4 - 2018 Staff Travel mode splits and future targets

Travel Mode	2018 TRAFFIX Survey	Future Targets	Target No of Staff*
Car Driver	67% (135 staff)	65%	138
Car Passenger	3% (6 staff)	3%	6
Public Transport	17% (34 staff)	23%	49
Active Travel	9% (18 staff)	9%	19

Source: Arup, 2014 and Traffix Surveys, April 2018

* Based on a future number of 212 staff.

3.3 Student Travel Targets

The current travel modes based on the student travel survey conducted by ARUP in 2014. The OTMP seeks to increase the use of alternate (non-private vehicle) transport for the site. The 2014 reliance upon car related transport to the school relates to approximately 60% of students (in the AM peak).

From the 2018 data it is evident that this reliance has been reduced to 54%, a 6% improvement. With this in mind, it is envisaged that the subject OTMP will encourage increased use of sustainable modes of transport, such as train, bus, bicycle and walking and utilization of the school bus service. The breakdown of the baseline travel mode split and proposed targets are shown below in the table overleaf.

In addition, two tables below shows the mode splits in 2018 as per the survey results undertaken by TRAFFIX which demonstrates that the target for no private vehicle net increase from 2014 has been met and non-private vehicle mode shares have been utilised by students of the school. This will enable future potential expansion of the school by 2030 as planned.

Table 5 - 2014 Student Travel Mode Splits and 2030 Future Targets

Travel Mode	Baseline AM Peak Period		Baseline PM Peak Period		Future PM Peak Period 2030	
	No.	%	No.	%	No.	%
Drop-off / Pick up	582	60%	447	46%	582	49%
*Walk / Active Travel	155	16%	233	24%	154	13%
School Bus	39	4%	68	7%	152	12%
*Public Transport	146	15%	175	18%	264	22%
Other	48	5%	48	5%	0	-
Total:	970	100%	970	100%	1200	100%

Source: Arup, 2014. *Note: The ARUP targets set out 5% of travel to shift to car-pooling. Due to the limited uptake in this travel mode in 2016 the school is proposing to further increase public transport and active travel modes to reduce reliance on private vehicles.

Table 6 - 2018 Student Travel Mode Splits

Travel Mode	Existing AM Peak Period	Existing PM Peak Period
	%	%
Private Vehicle (Drop-off / Pick up)	54%	43%
Walk	18%	22%
Bus	8%	9%
Public Transport	20%	26%

Source: Traffic Surveys, April 2018

4. Traffic Surveys Analysis

4.1 Introduction

This aim of this section is to analyse the results of the traffic surveys. This information is imperative to identifying the existing traffic volumes patterns. These traffic surveys included tube counts for seven (7) days over two (2) separate time periods. These were one (1) week in term time (Sunday 8th April 2018 – Friday 13th April 2018) and one (1) week in the school holidays (Sunday 15th April 2018 – Friday 20th April 2018).

Tube traffic counts were conducted on the following streets:

- Albion Street (between Macpherson Street and Bronte Road),
- Macpherson Street (between Albion Street and Leichhardt Street),
- Leichhardt Street (between Macpherson Street and Bronte Road), and
- Bronte Road (between Henrietta and Prospect Street).

Turning movement counts were conducted during the AM and PM peak periods on a typical Thursday and Saturday at the following intersections:

- Macpherson Street / Albion Street,
- Macpherson Street / Leichhardt Street,
- Bronte Road / Leichhardt Street, and
- Bronte Road / Albion Street.

Surveys of the pick-up zones were undertaken during an AM and PM peak period on one (1) weekday during the last week of Term 1 on:

- Macpherson Street,
- Leichhardt Street, and
- Albion Street.

4.2 Survey Results

The surveys show that generally there has been an increase in traffic volumes during the AM (8:00am-9:00am) and PM (3:00pm-4:00pm) peak periods on the streets surrounding the school. However, comparing this to the hour after the AM peak (9:00am-10:00am), the commuter peak (5:00pm-6:00pm) and weekend peak (12 midday-1:00pm), which would all be unaffected by school traffic, most streets have seen similar or lower increases.

Overall, the increase between 2014 and 2018 during the school peaks are in line with the AM peak, commuter peaks and weekend peak increases. The school peaks increased 9% and 6% between 8-9am and 3-4pm and increases of between 7% and 9% at the other peak times unaffected by the school. This is also in line with average weekday daily traffic increasing 6% since 2014 and the average daily traffic including weekends also increased 6%.

Therefore, it is most likely that the school is not the only cause of the increases as they have occurred during other peak periods unaffected by the school and are likely to be increases in background traffic.



Figure 1 - Location of Traffic Surveys

Table 7 - Average weekly traffic volumes in 2014, 2016, 2017 and 2018 around St Catherine's School during School Term.

Location	Years of surveys compared		Weekday AM Peak (8am-9am)	Weekday AM Peak (9am-10am)	Weekday PM School Peak(3pm-	Weekday PM Commuter Peak(5pm-6pm)	Weekday PM Commuter Peak (6pm-7pm)	Weekend PM Peak (12pm-1pm)
Leichhardt Street	2014		1,181	910	1,170	1,215	1,102	1,234
	2016		1,094	955	1,057	1,151	1,055	1,196
	2017		1,138	1,193	1,024	1,215	1,280	1,373
	2018		1,322	1,027	1,371	1,392	1,168	1,398
	2014-2018	No.	+141	+117	+201	+177	+66	+164
	2014-2018	%	+12%	+13%	+17%	+18%	+15%	+6%
			-1% of network increase between school and non-school peak times		-1% of network increase between school and non-school peak times			
	2016-2018	No.	+228	+72	+314	+241	+113	+202
	2016-2018	%	+21%	+8%	+30%	+21%	+11%	+17%
Albion Street	2014		660	568	766	722	746	677
	2016		681	555	625	624	609	677
	2017		604	664	776	611	567	717
	2018		757	591	755	746	653	744
	2014-2018	No.	+97	+23	-11	+24	-93	+67
	2014-2018	%	+15%	+4%	-1%	+3%	-12%	+10%
			+11% network increase between school and non-school peak times		-4% network increase between school and non-school peak times			
	2016-2018	No.	+76	+36	+130	+122	+44	+67
	2016-2018	%	+11%	+6%	+21%	+20%	+7%	+10%

Source: Arup, 2014 and Traffix Surveys, 2016, 2017 and 2018

Location	Years of surveys compared		Weekday AM Peak (8am-9am)	Weekday AM Peak (9am-10am)	Weekday PM School Peak(3pm-4pm)	Weekday PM Commuter Peak(5pm-6pm)	Weekday PM Commuter Peak (6pm-7pm)	Weekend PM Peak (12pm-1pm)
Macpherson Street	2014		1,115	942	1,204	1,135	1,063	1,202
	2016		1,022	882	1,011	974	895	1,060
	2017		1,121	1,066	839	1,040	1,059	1,121
	2018		1,129	976	1,213	1,168	984	1,239
	2014-2018	No.	+14	+34	+9	+33	-79	+37
	2014-2018	%	+1%	+4%	+1%	+3%	-7%	+3%
			-3% network increase between school and non-school peak times		-2% network increase between school and non-school peak times			
	2016-2018	No.	+107	+94	+202	+194	+89	+179
	2016-2018	%	+10%	+11%	+20%	+20%	+10%	+17%
Bronte Road	2018		502	435	575	626	541	596
Overall	2014		2,956	2,420	3,140	3,072	2,911	3,113
	2016		2,797	2,392	2,639	2,749	2,559	2,933
	2017		2,863	2,923	2,639	2,866	2,906	3,211
	2018 (excluding Bronte Rd)		3,208	2,594	3,339	3,306	2,805	3,381

Source: Arup, 2014 and Traffix Surveys, 2016, 2017 and 2018

Table 8 Total daily traffic volumes for each day surveyed in 2014, 2016, 2017 and 2018 during School Term

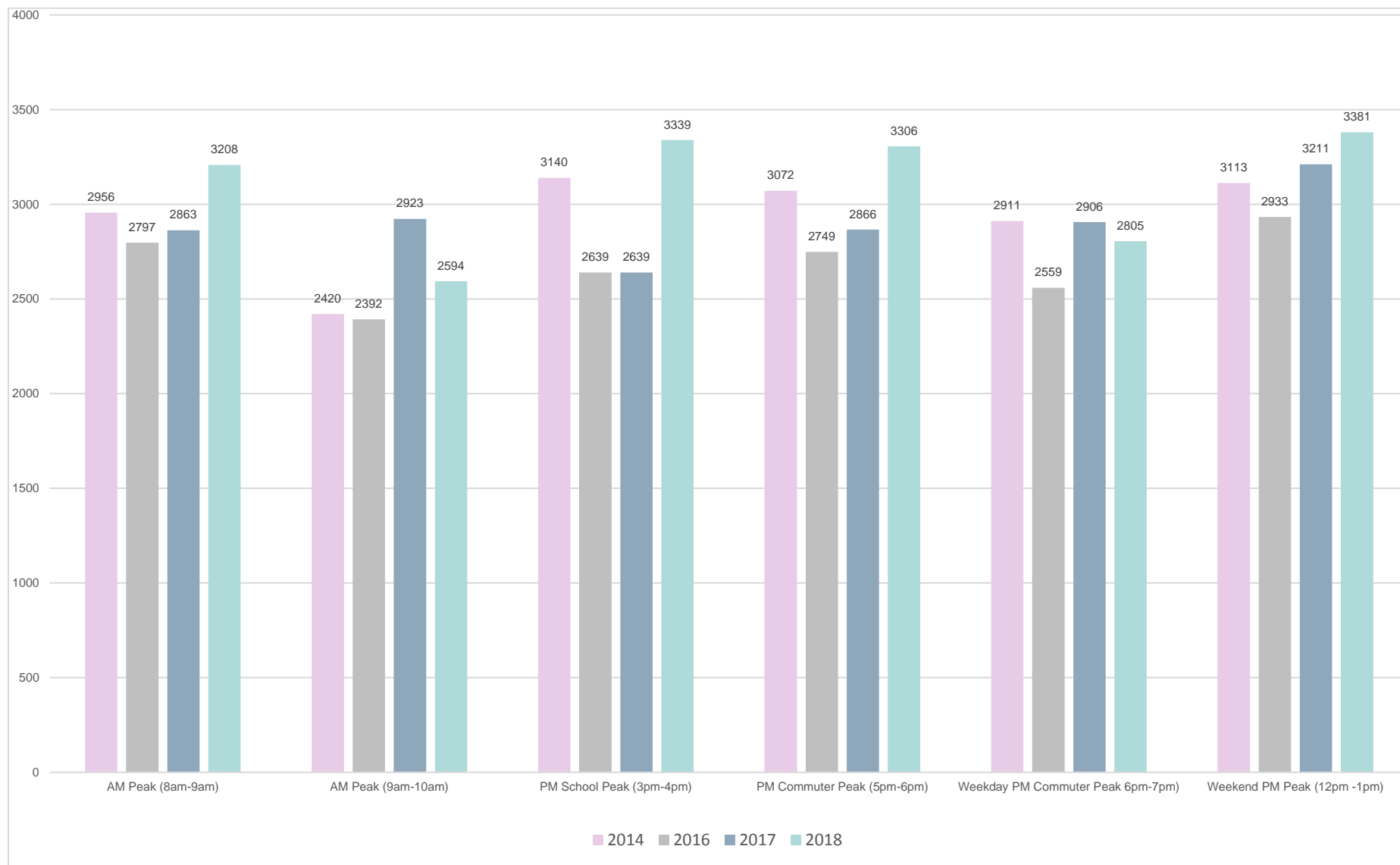
Years of surveys compared	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Weekday	7 Day Average
2014	37,921	38,648	39,661	40,544	39,285	40,605	35,335	39,212	38,857
2016	34,477	35,934	36,138	37,854	38,705	38,169	29,792	36,620	35,865
2017	35,572	39,942	40,322	40,438	40,287	39,571	36,390	39,311	38,932
2018	39,326	40,052	41,850	43,290	44,133	41,342	37,784	41,728	41,110

Source: Arup, 2014 and Traffix Surveys, 2016, 2017 and 2018

Table 9 Total daily traffic volumes for each day surveyed in 2016, 2017 and 2018 during School Holidays

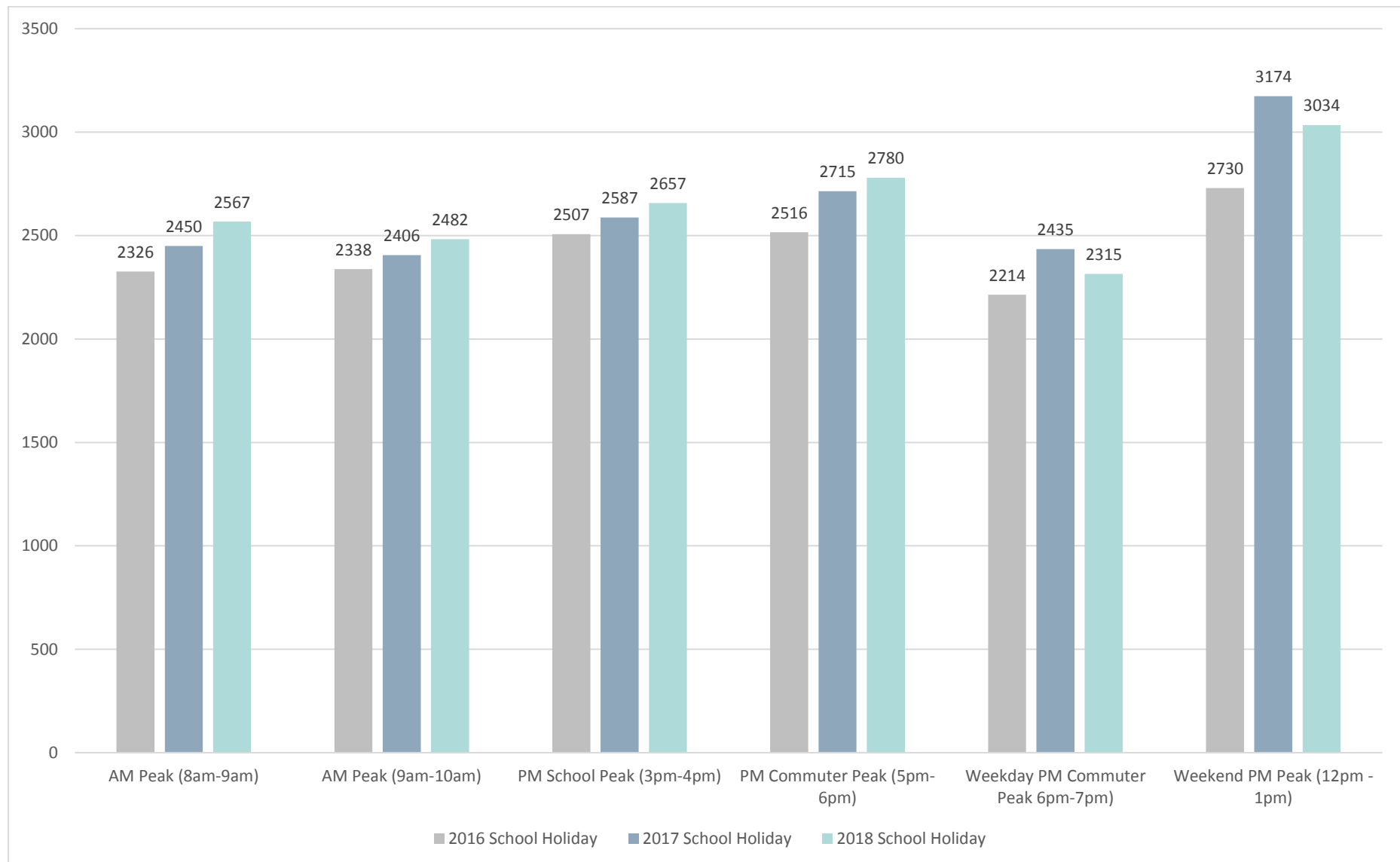
Years of school holiday surveys compared	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Weekday	7 Day Average
2016	32,964	33,410	35,438	34,516	35,784	32,594	32,134	34,421	33,833
2017	37,313	36,349	36,639	37,989	32,273	42,462	34,243	36,110	36,749
2018	35,544	35,094	36,410	37,863	38,123	36,247	33,579	36,606	36,122

Source: Arup, 2014 and Traffix Surveys, 2016, 2017 and 2018



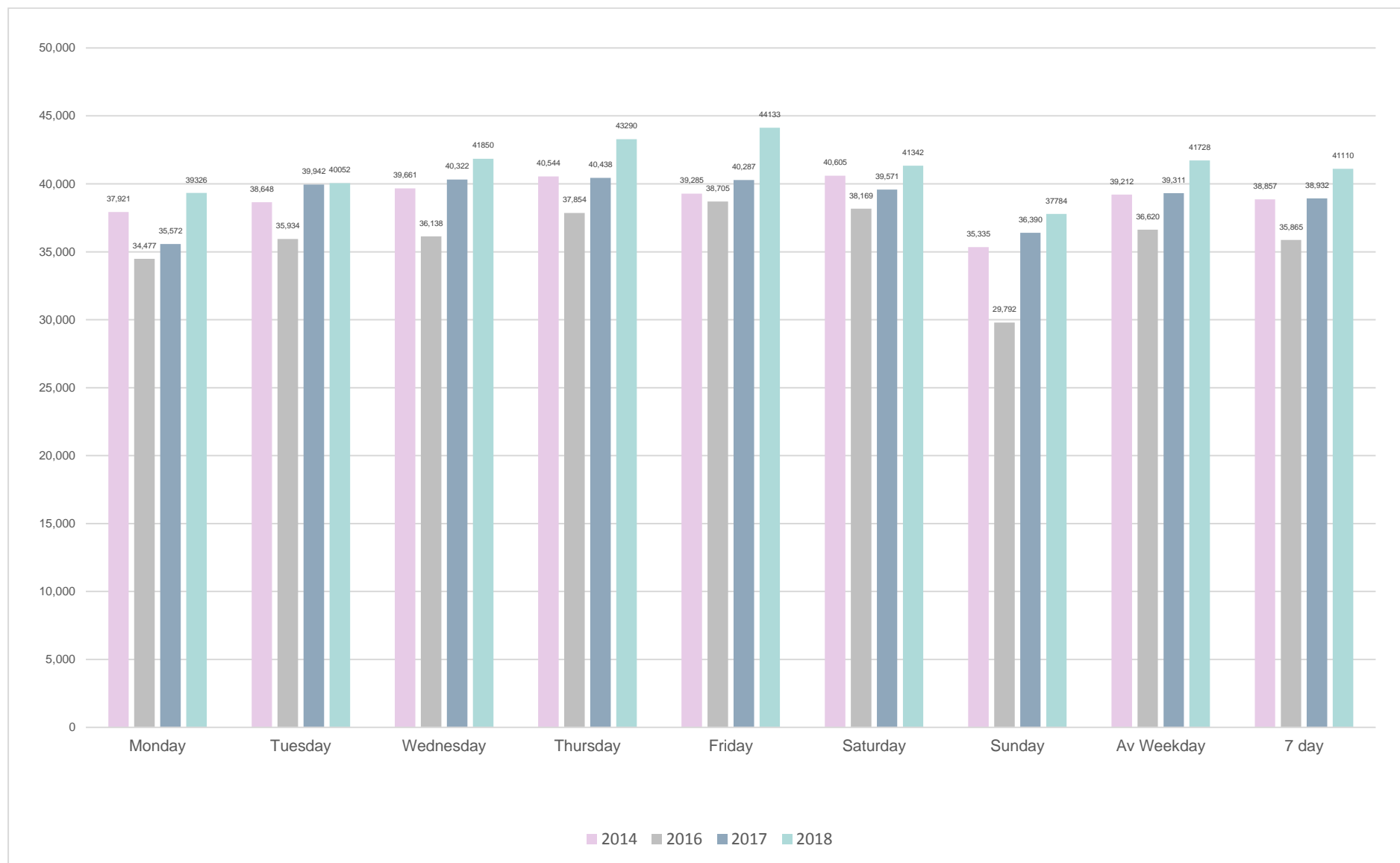
Source: Arup, 2014 and Traffix Surveys, 2016, 2017 and 2018

Figure 2 - Traffic Volumes at peak times around St Catherine's School between 2014 and 2018 during School Term



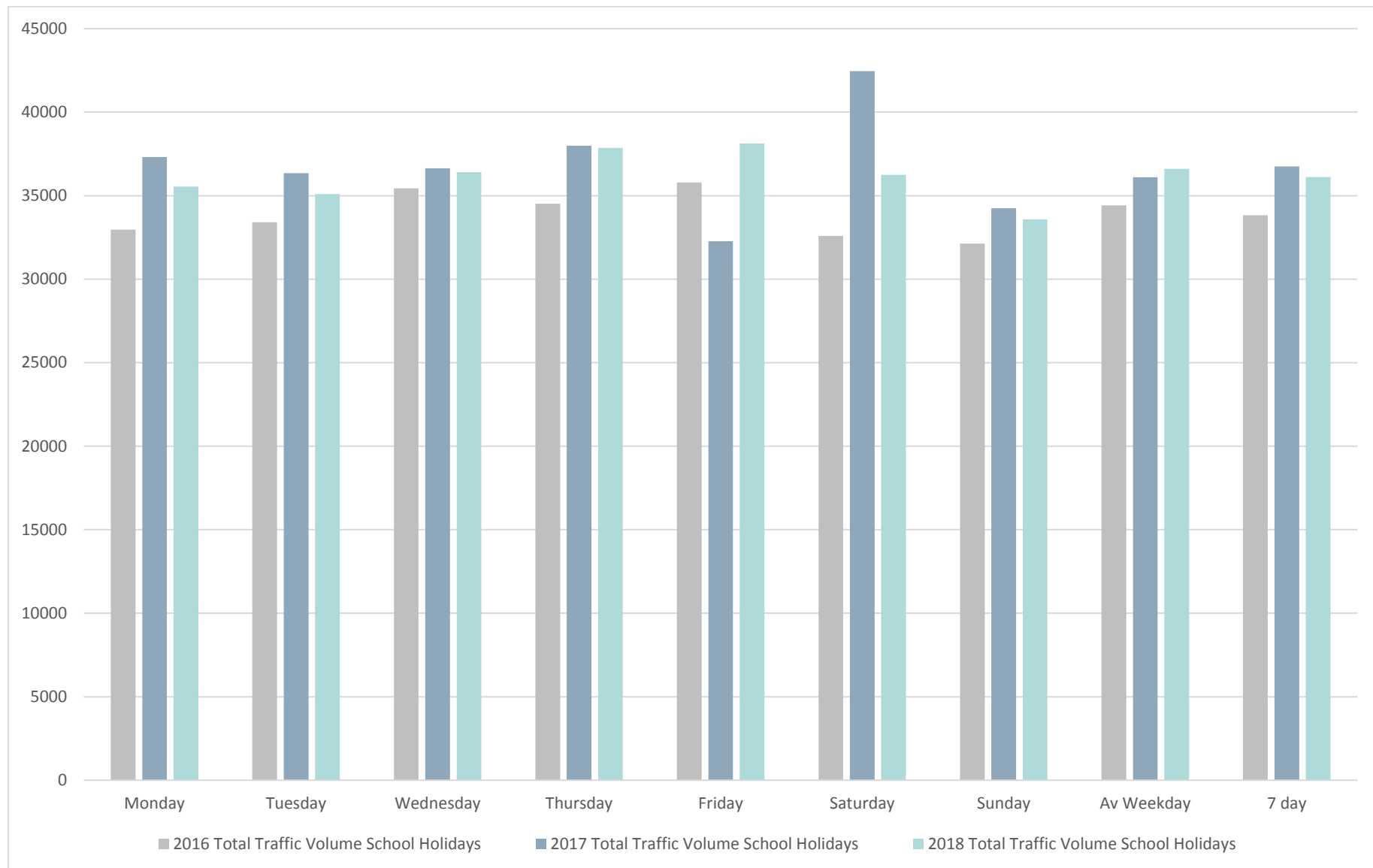
Source: Arup, 2014 and Traffix Surveys, 2016, 2017 and 2018

Figure 3 - Traffic Volumes at peak times around St Catherine's School between 2016 and 2018 during School Holidays



Source: Arup, 2014 and Traffic Surveys, 2016, 2017 and 2018

Figure 4 - Total daily traffic volumes for each day surveyed from 2014 to 2018 during School Term



Source: Arup, 2014 and Traffix Surveys, 2016, 2017 and 2018

Figure 5 - Total daily traffic volumes for each day surveyed from 2016 to 2018 during School Holidays

4.3 Traffic Distribution 2018

4.3.1 School Term Intersection Diagrams

Figure 6 and Figure 7 show the turning counts at each of the four intersections surrounding the St Catherine's site during the School term and school holidays respectively in the AM peak period between 8:00am and 9:00am.

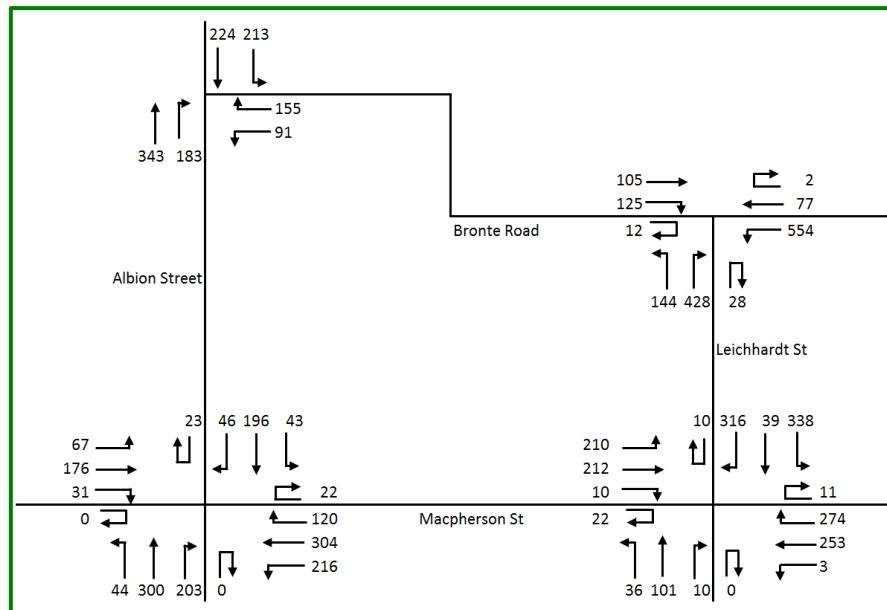


Figure 6 - AM Peak (8:00am-9:00am) turning counts during School Term around St Catherine's

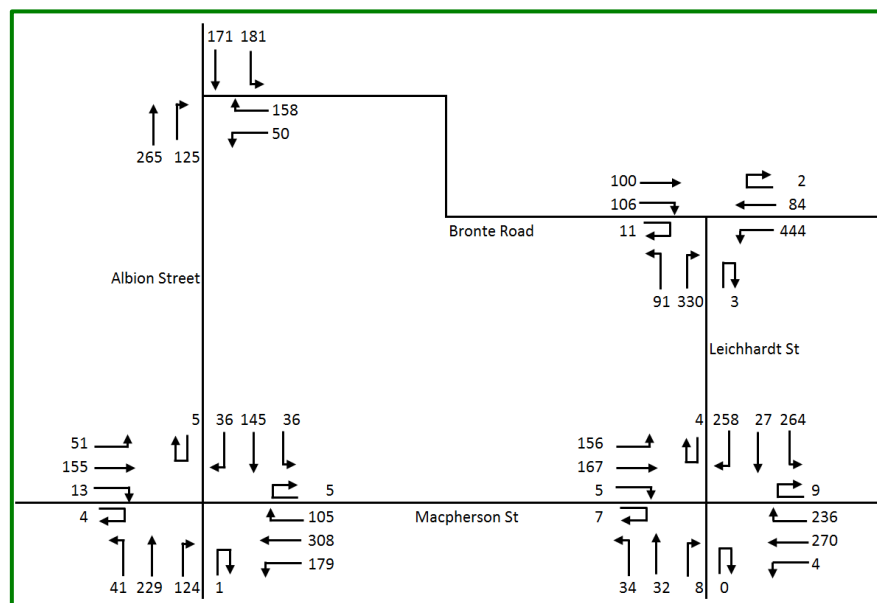


Figure 7 - AM Peak (8:00am-9:00am) turning counts during School Holidays near St Catherine's

Figure 8 and Figure 9 show the turning counts at each of the four intersections surrounding the St Catherine's site during the School term and school holidays respectively in the PM peak period between 5pm and 6pm.

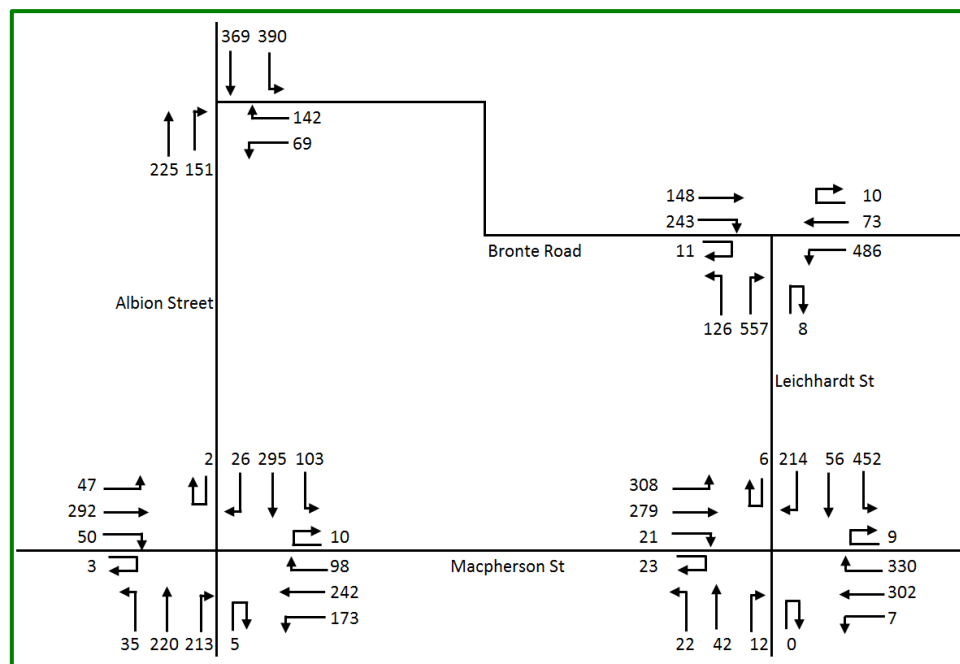


Figure 8 - PM Peak (5:00pm-6:00pm) turning counts during School Term around St Catherine's

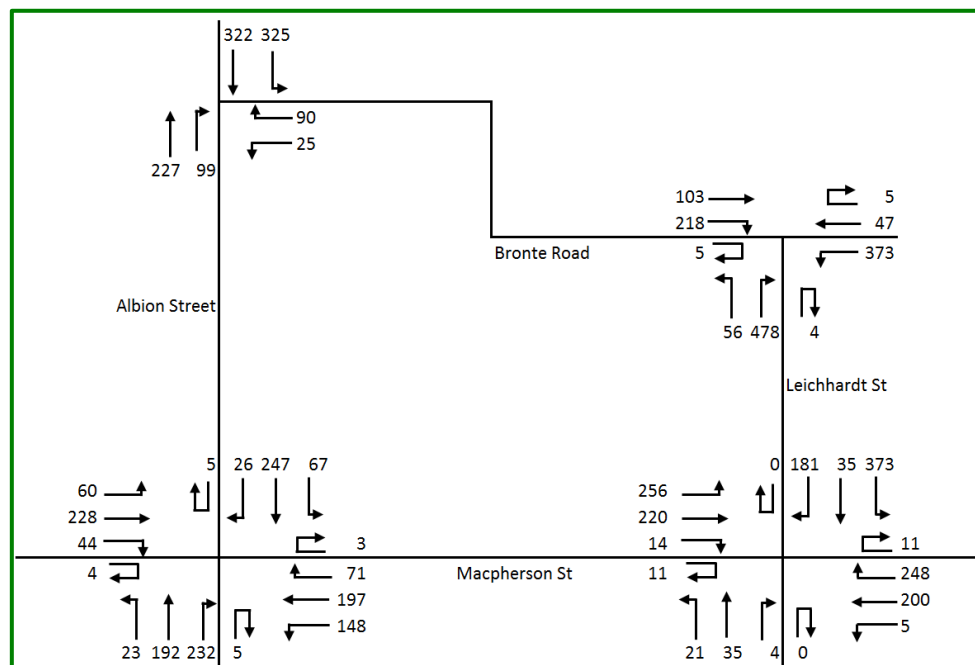


Figure 9 - PM Peak (5:00pm-6:00pm) turning counts during School Holidays around St Catherine's

4.3.2 Midblock Traffic Flows

Figure 10 and Figure 11 show the midblock traffic flows near the St Catherine's site during the School term and school holidays respectively in the AM peak period between 8:00am and 9:00am.

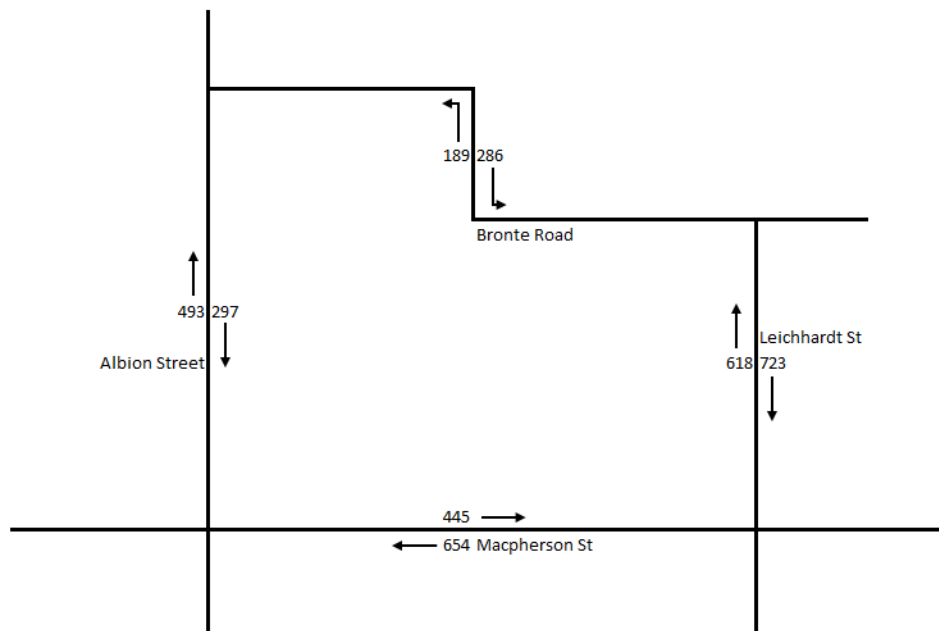


Figure 10 AM Peak (8am-9am) Midblock Flows during School Term

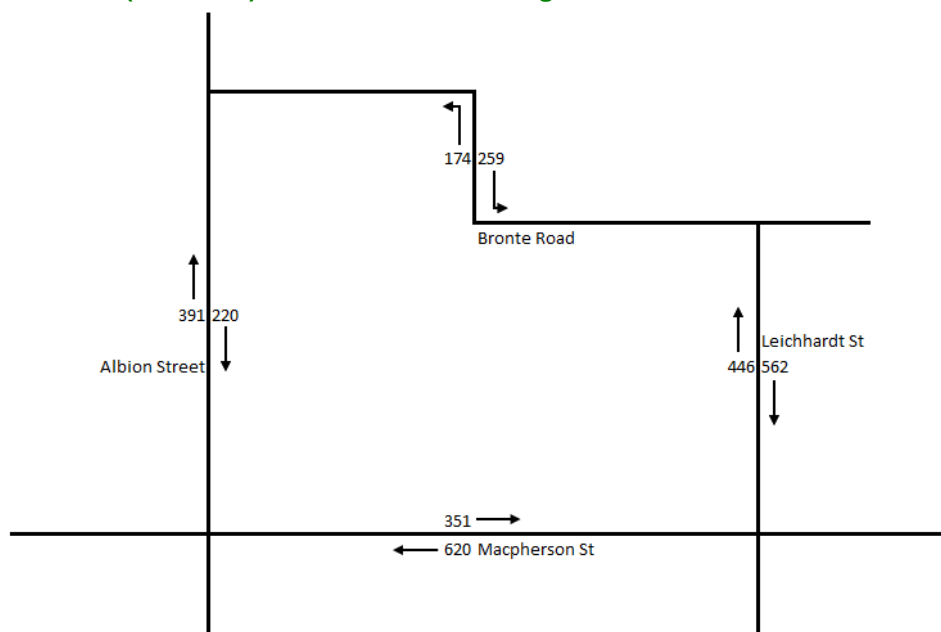


Figure 11 AM Peak (8am-9am) Midblock Flows during School Holidays

Figure 12 and Figure 13 show the midblock traffic flows near the St Catherine's site during the School term and school holidays respectively in the PM school peak period between 3:00pm and 4:00pm.

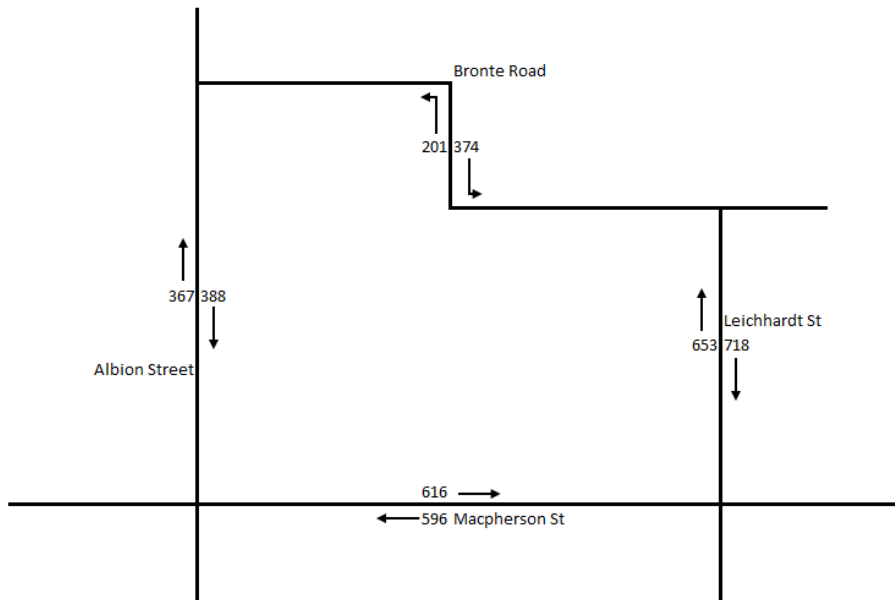


Figure 12 PM School Peak (3pm-4pm) Midblock Flows during School Term

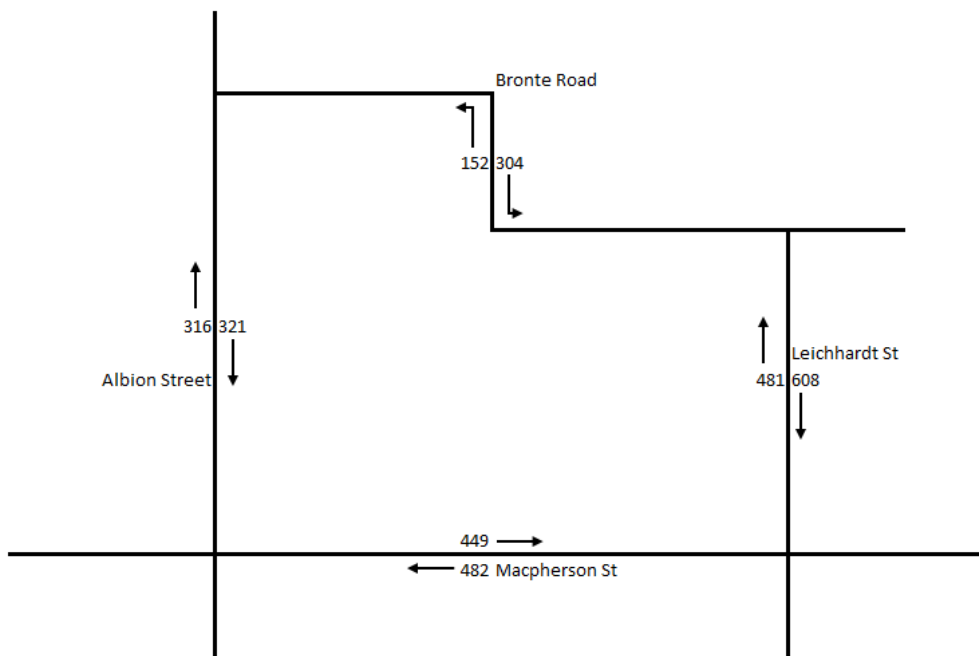


Figure 13 PM School Peak (3pm-4pm) Midblock Flows during School Holidays

Figure 14 and Figure 15 show the midblock traffic flows near the St Catherine's site during the School term and school holidays respectively in the PM commuter peak period between 5:00pm and 6:00pm.

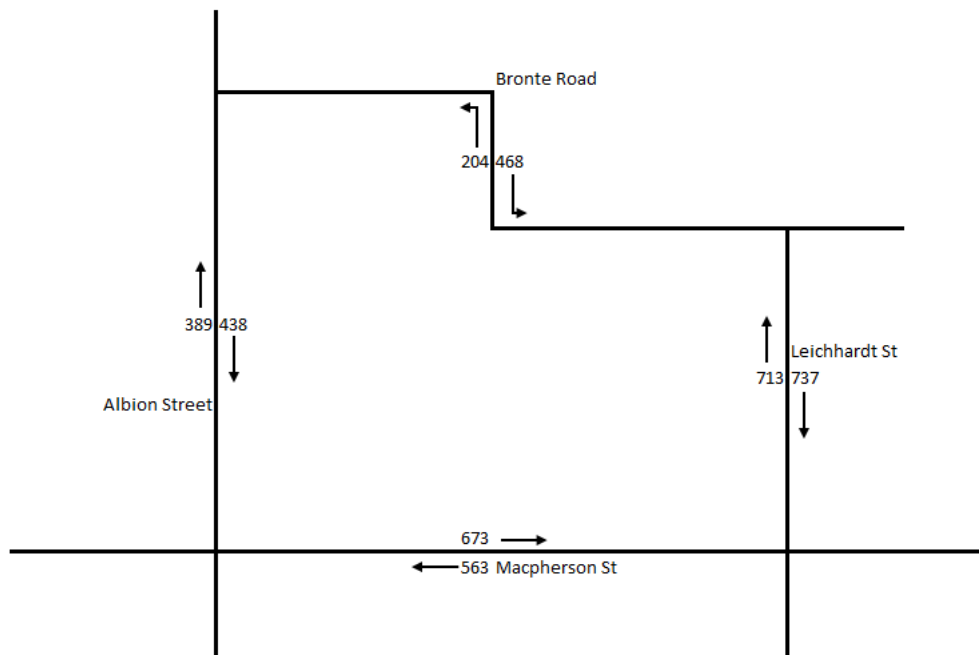


Figure 14 PM Commuter Peak (5pm-6pm) Midblock Flows during School Term

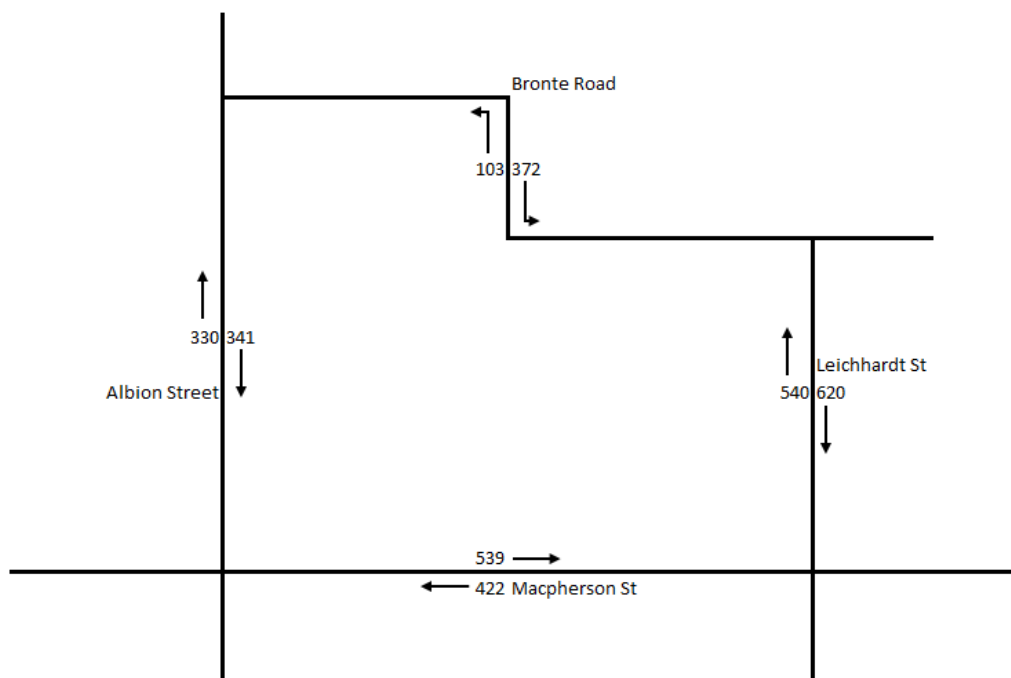


Figure 15 PM Commuter Peak (5pm-6pm) Midblock Flows during School Holidays

The following diagrams show the difference between the school term and school holiday for each movement at each intersection. The difference during the AM peak which would be affected by the school during the school term has some movements with significant differences. However, when compared to the differences at the commuter peak (between 5-6pm) similar changes occur for movements with significant changes. There are only six movements with significant increases in traffic during the school term which does not occur at the commuter peaks. These include:

- ➡ Albion Street and Bronte Road - Albion Street straight through to Bronte Road
- ➡ Albion Street and Macpherson Street - Albion Street northbound
- ➡ Albion Street and Macpherson Street - Albion Street northbound right on to Macpherson Street
- ➡ Macpherson Street and Leichhardt Street - Leichhardt Street southbound right on to Macpherson Street
- ➡ Macpherson Street and Leichhardt Street - Macpherson Street eastbound

The scale of impact of change is shown by darker shades of green. Therefore the school does not appear to be having a significant impact on traffic flows at intersections around the site.

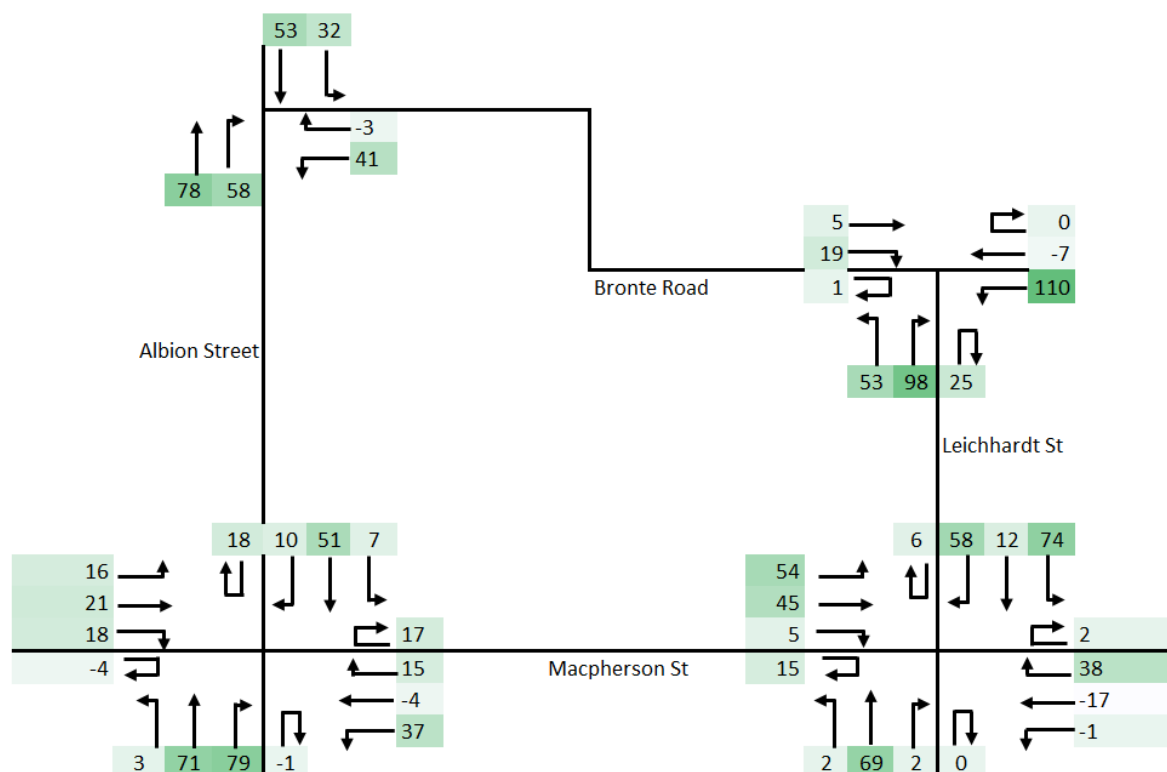


Figure 16 AM Peak (8-9am) turning count differences

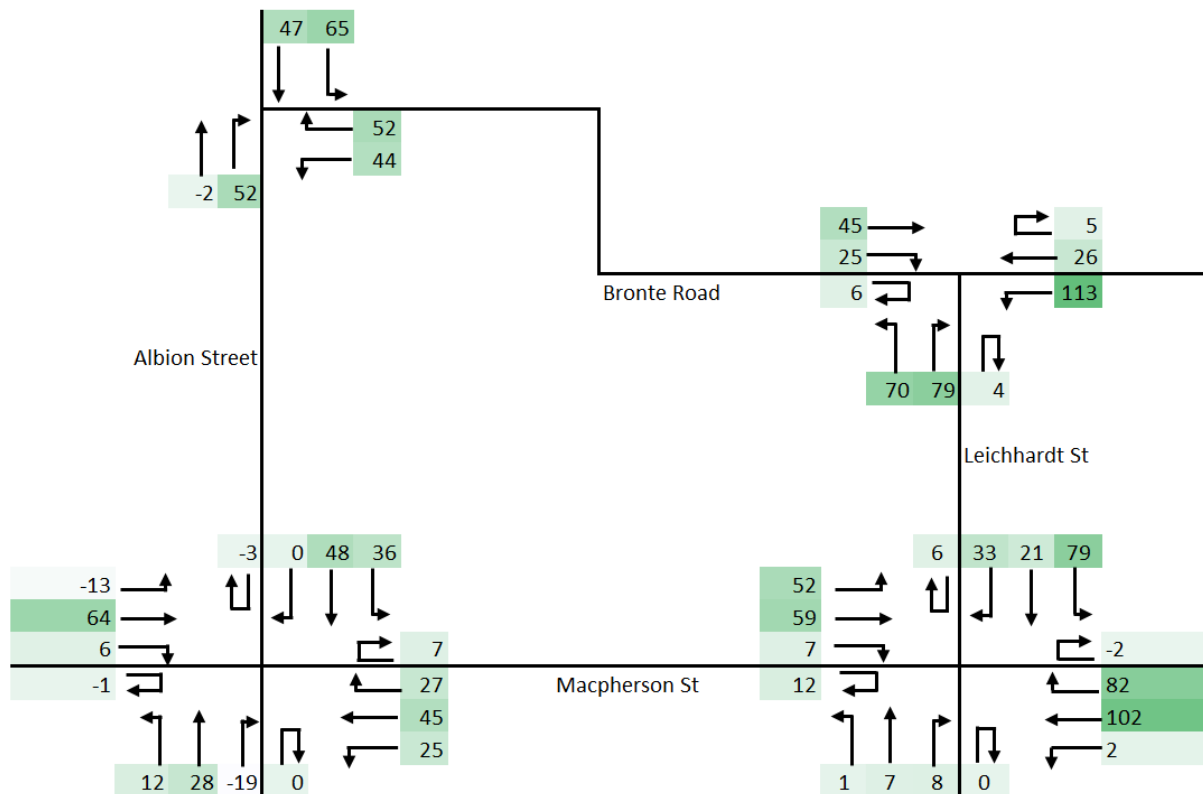


Figure 17 PM Peak (5-6pm) turning count differences

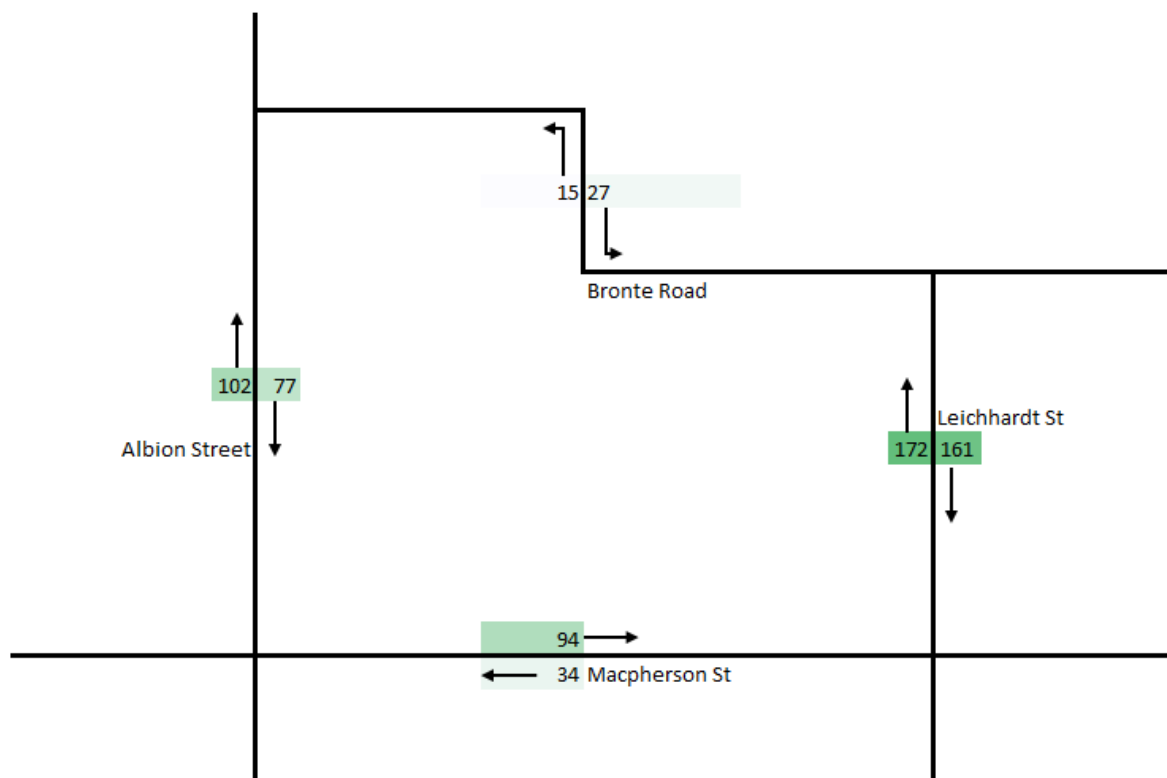


Figure 18 AM Peak (8am-9am) Midblock Flow differences

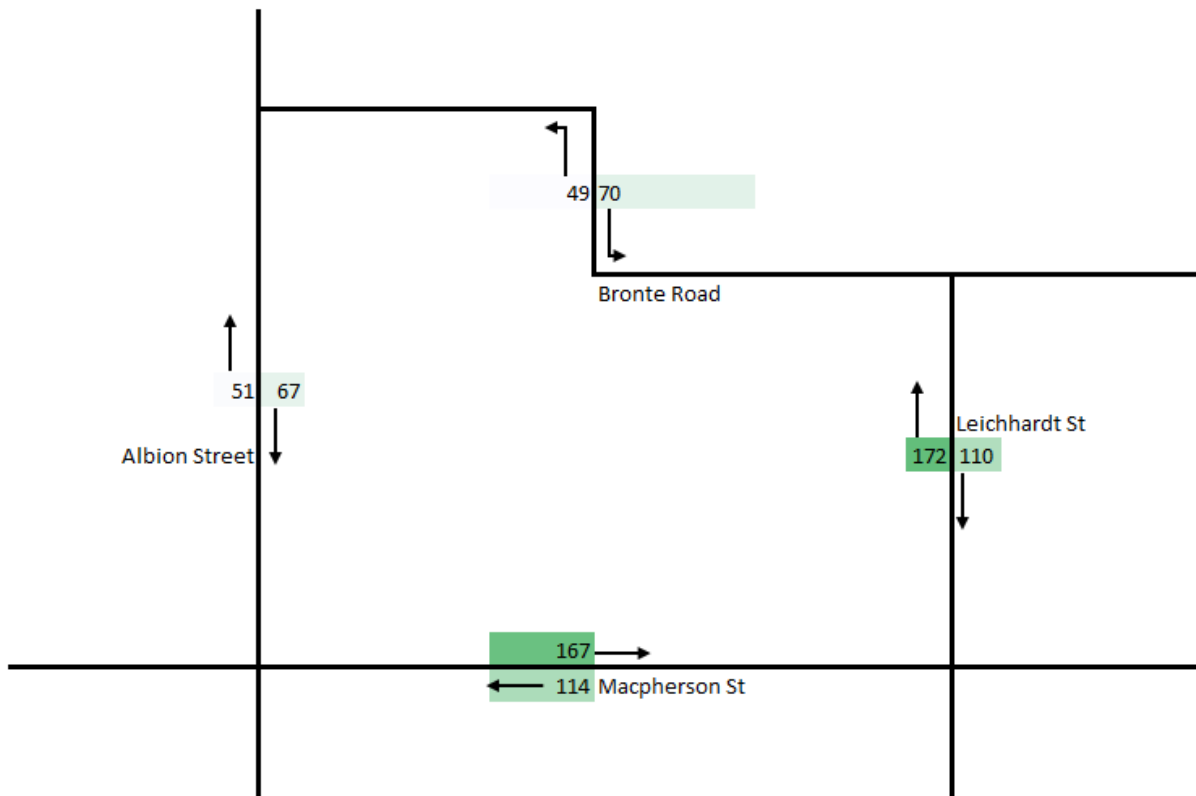


Figure 19 PM Peak (3pm-4pm) Midblock Flow differences

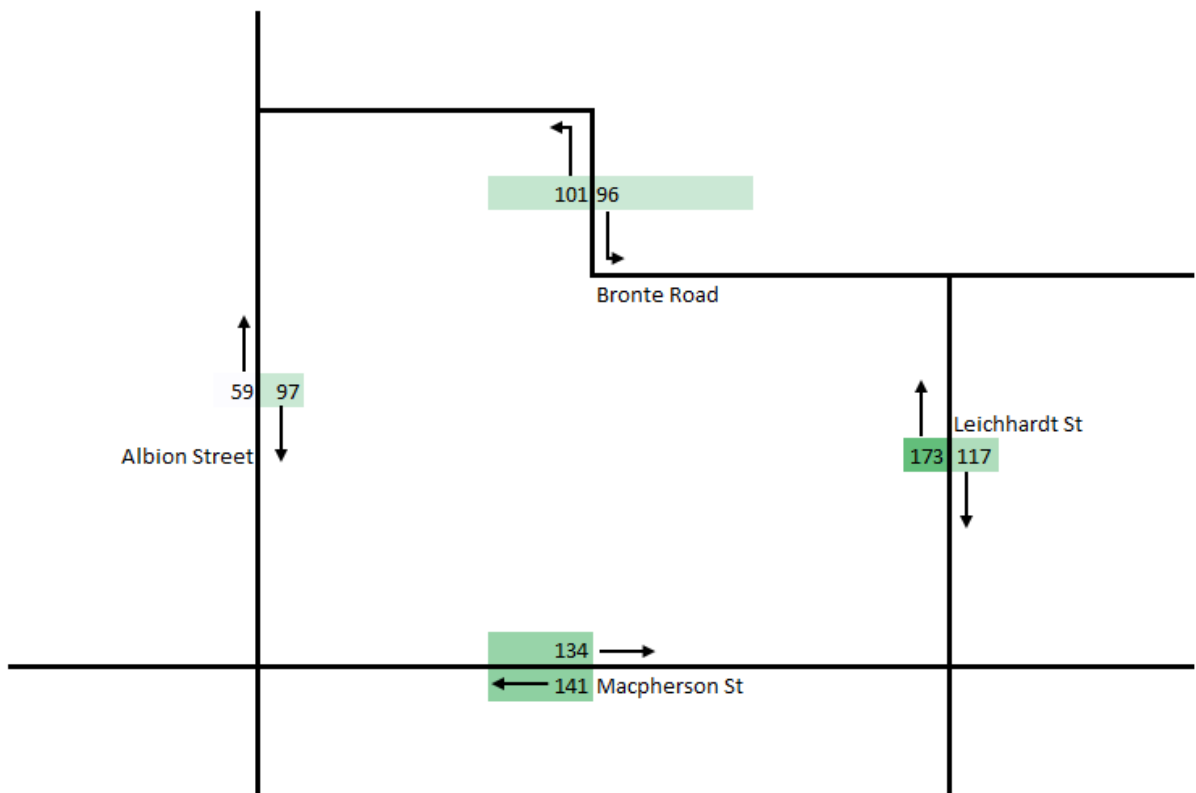


Figure 20 PM Peak (5pm-6pm) Midblock Flow differences

4.3.3 Pick and Drop off zone turning counts

The zones analysed are shown in Figure 21.

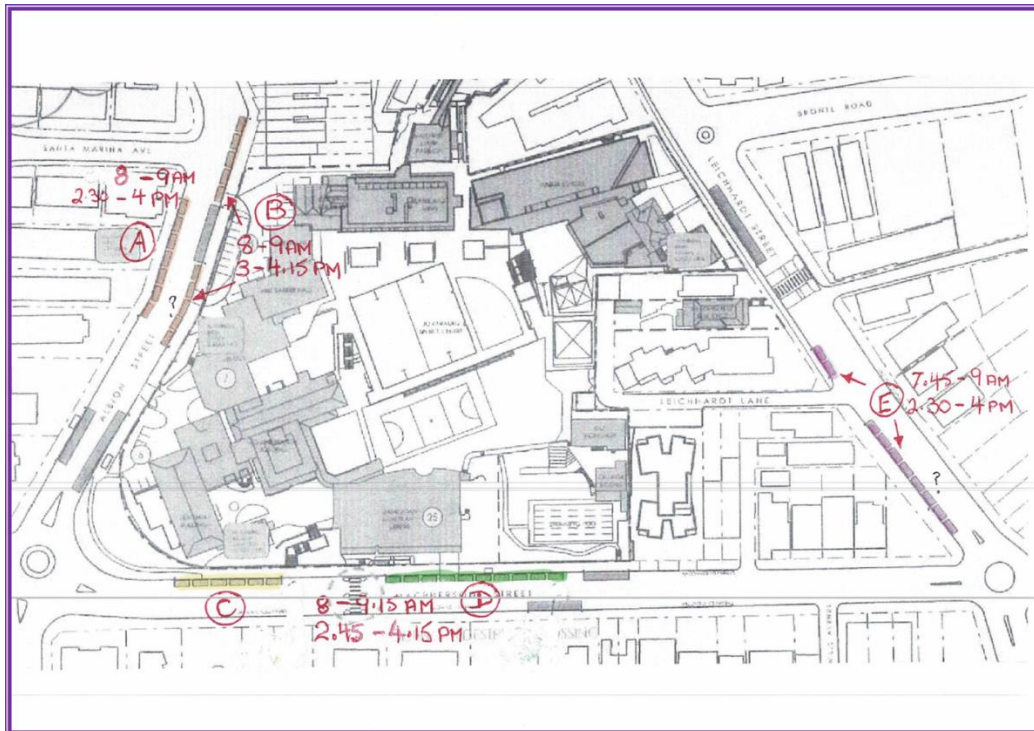


Figure 21 Pick up and Drop Off Zones.

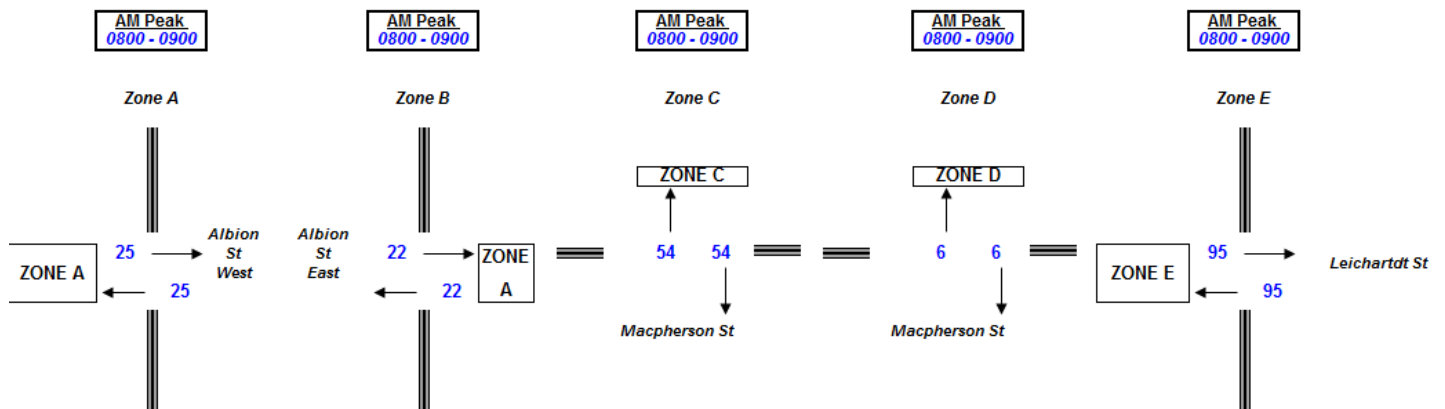


Figure 22 Pick up and Drop Off Zone Turning Counts - AM Peak.

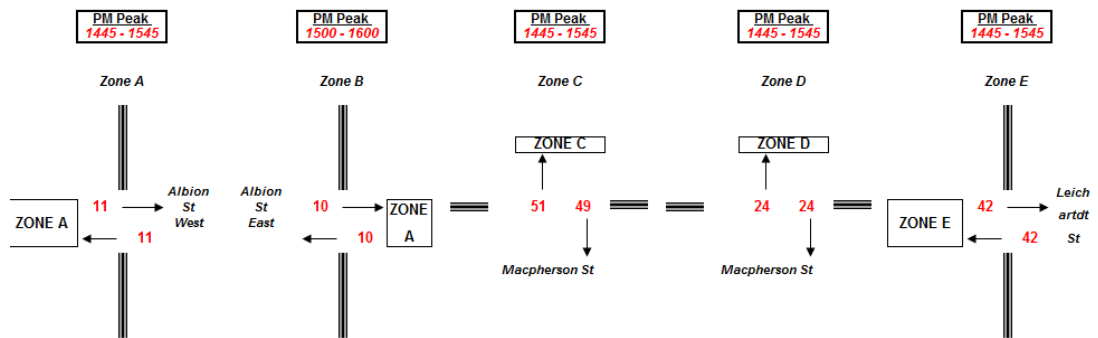


Figure 23 Pick up and Drop Off Zone Turning Counts - PM Peak.

In summary, from Figure 22, the pickup and drop off data for all zones demonstrate negligible traffic movements past 8.30am during the AM Peak.

From Figure 23, Zone A on Albion St is not utilised prior to 3:00pm and Zone D on Macpherson St is not utilised after 4:00pm.